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Operating Instructions

U.H.F. MILLIVOLTMETER

TYPE TF 1262

MARCONI INSTRUMENTS LIMITED, ENGLAND

OPERATING INSTRUCTIONS No. EB 1262

for

U.H.F. MILLIVOLTMETER TYPE TF 1262

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DRAWINGS

CIRCUIT DIAGRAM.....TB 27624

SCHEDULE OF PARTS SUPPLIED

The complete equipment comprises:-

1. One U.H.F. Millivoltmeter Type TF 1262, including a crystal diode as follows:-

   Crystal Diode: One: Type CS2A, Silicon Diode.

2. One Type N, 75-ohm, Coaxial, Free Plug.

3. One Instruction Book No. EB 1262.

The following accessories are available to special order:-

4. One Input Adapter, with Type N Plug one end; P.O. No. 1 plug other end.

5. One Input Adapter, with Type N Plug one end; Marconi Type 400 connector other end.

1. DESCRIPTION

1.1. GENERAL

The U.H.F. Millivoltmeter TF 1262 is a portable crystal-rectifier instrument for use at any frequency between 1 and 500 Mc/s. It measures voltages above 50 mV in two ranges: 0.5 volt full scale and 1 volt full scale.

The TF 1262 presents an input impedance of 75 ohms. Up to 400 Mc/s the v.s.w.r. is better than 1.1 and up to 500 Mc/s it is better than 1.15. Particular applications of the instrument include the measurement of the terminal p.d. of amplifiers, oscillators, and signal generators, when loaded with 75 ohms.

1.2. DESIGN DETAILS

To provide a matched termination having a constant 75-ohm impedance over the frequency range of the instrument, a tapered slab-line assembly is used in the input circuit. R.F. power from the source being measured is dissipated in a 75-ohm cracked carbon resistor which forms the centre conductor. The curvature of the plates forming the outer conductor of the slab-line assembly may be varied by screw adjustment and is preset for minimum v.s.w.r. The inlet is a type N socket.

A fraction of the R.F. power is tapped from the cracked carbon resistor and detected by a crystal rectifier. The rectified output is indicated on a meter calibrated in voltage. Between the meter and rectifier, a switched series resistor alters the meter sensitivity to provide a second voltage range.

When the ON/OFF toggle switch is set to OFF, the meter is disconnected from the rectifier circuit and has a short-circuit connected across it to damp its movement. Power, however, continues to be dissipated in the cracked carbon resistor and voltage is applied to the crystal until the power source is disconnected from the inlet socket.

2. OPERATION

2.1 MAKING A MEASUREMENT

Requiring no power supply or warming-up period, the instrument is ready for immediate use. It may be placed or suspended at any convenient point near the r.f. source to be measured.

To make a measurement proceed as follows:-

(1) Connect the r.f. source to the Type N inlet on the Millivoltmeter.

(2) Set the front panel toggle switch to the required range.

(3) Switch ON and read the voltage directly from the meter, using the appropriate scale.

NOTE:

(a) The instrument is calibrated to read the r.m.s. voltage of a c.w. sinusoidal signal.

(b) The calibration is based on an ambient temperature of 20°C: if the temperature is substantially higher, subtract 0.2% of full scale from the meter reading for each °C above 20°C; if the temperature is substantially lower, add 0.2% of full scale to the meter reading for each °C below 20°C.

The frequency characteristic relative to the response at 70 Mc/s is flat to within ±0.5 dB from 1 Mc/s to 300 Mc/s, and rises to about +1.5 dB at 500 Mc/s. At lower readings the characteristic may deteriorate slightly.

3. MAINTENANCE

3.1. REMOVAL OF CASE

The case may be removed after withdrawing the eight instrument-head screws adjacent to the edge of the panel.

3.2. REPLACING CRYSTAL

The rectifier crystal, MR 1, is retained in position by clips attached to the upper plate of the slab-line assembly.

The crystal, BTH type CS2A, used in the instrument is specially selected. If this crystal is replaced by the user, the meter sensitivity should be adjusted if necessary, by altering the value of R2 and R3, and the calibration of the meter should be checked.

A suitable method of adjusting the sensitivity and checking the calibration is given below and requires the use of an accurate a. c. voltmeter, a 100-μF electrolytic capacitor, and an a. c. (40 to 60 c/s) voltage supply variable from 0 to 1 volt. The electrolytic capacitor must have a low leakage current so that substantially all the rectified current flows through the meter; to ensure this, the capacitor may be tested and formed beforehand.

If the procedur e given in this section is carried out at a temperature other than 20°C, the readings obtained on the Millivoltmeter scales may be corrected for temperature as described in NOTE (b) at the end of Sect. 2.1.

To adjust the sensitivity and check the calibration of the meter proceed as follows:-

(1) Connect the 100-μF electrolytic capacitor across C1. The positive terminal of the electrolytic capacitor must be connected to the same side of C1 as R2.

(2) Set the Millivoltmeter range switch to 500 mV and switch ON.

(3) Apply an a. c. (40 to 60 c/s) voltage of less than 0. 5 volt to the input socket of the Millivoltmeter and set up an accurate a. c. voltmeter to monitor this voltage.

3.2. (continued)

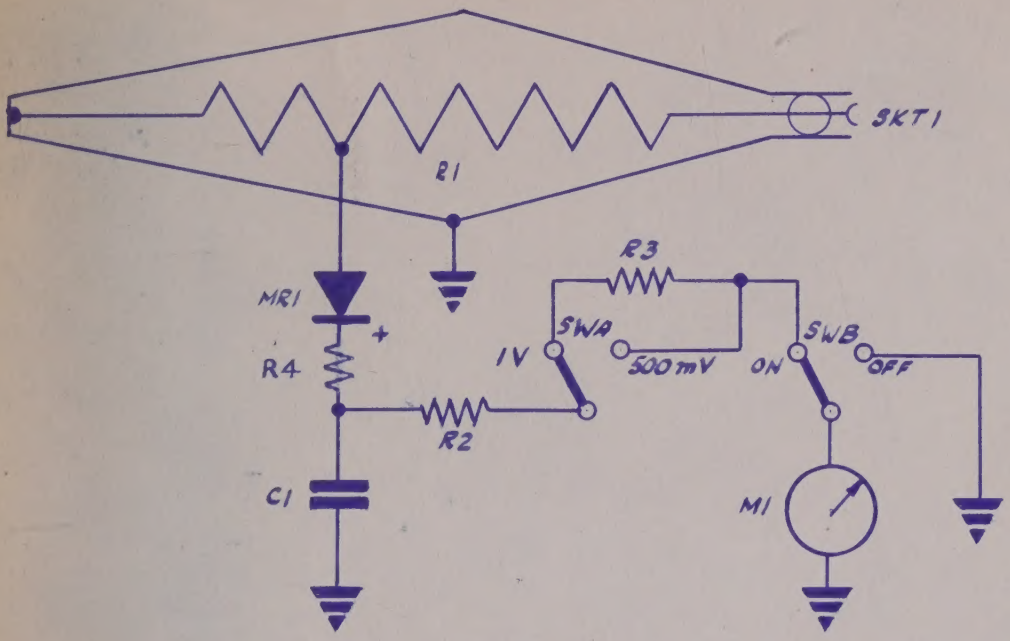
(4) Gradually increase the a.c. voltage till the monitoring voltmeter indicates 500 mV.

(5) Check the indication on the Millivoltmeter with that of the a.c. voltmeter and, if necessary, adjust the value of R2 until the Millivoltmeter gives a correct f.s.d. indication of 500 mV.

(6) Vary the a.c. voltage applied to the TF 1262 over the 500-mV range and check the meter calibration against the voltage reading on the accurate a.c. voltmeter.

(7) If the measurement error exceeds the required accuracy at any point on the scale, replace the crystal and repeat the procedure.

(8) When a crystal has been selected to suit the 500 mV range, adjust the value of R3 to give a correct f.s.d. reading on the 1 volt range.



REF.	DESCRIPTION	S/L REF.
R1	RESISTOR 75Ω ± 5% 7·5 W.	14A/TM5598
R2	RESISTOR 700Ω ± 1% ¼ W.	15/TM5598
R3	RESISTOR 5·6kΩ ± 1% ¼ W	16/TF.1262
R4	RESISTOR 150Ω ± 10% ¼ W	17/TM5598
C1	CAPACITOR 1000pF ± 20% 350V.	20/TM5598
M1	METER	1/TF.1262
MR1	CRYSTAL RECTIFIER	23/TM5598
SKT1	INPUT SOCKET 70Ω	24/TM5598
SWA	TOGGLE SWITCH D.P.C.O.	7/TF.1262
SWB	TOGGLE SWITCH D.P.C.O.	7/TF.1262

TITLE CIRCUIT DIAGRAM FOR U.H.F. MILLIVOLTMETER	
DRN. D.R. HAWTHORN	ASSY TD. 27620
DATE 8-11-'57	S. LIST. TF1262
CHKD	SCALE
APP	DRG NO TB. 27624
TRACED	
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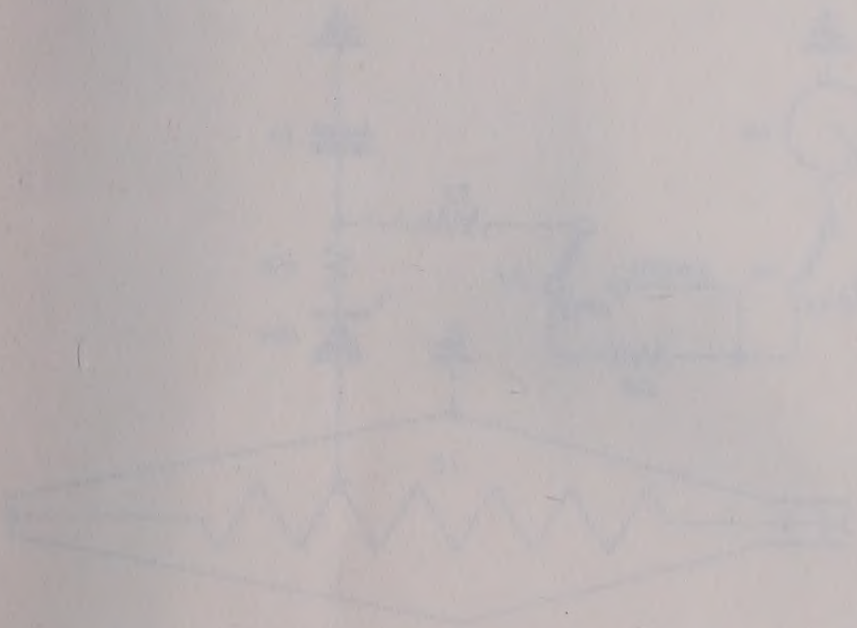

Printed in England SK 8/63 B W L